electrode **1404**, similarly to areas A_1 and A_2. But the user decides to press the touch screen **1400** at a point **x6** within the third area A_3. The controller **1406** detects the finger press (activation of the function assigned to the area A_3) and responds by applying a high-intensity signal to the electrode **1404**.

Thus the embodiment shown in FIG. **14** can provide the user with a tactile feedback which creates an illusion of a textures surface, although only a single electrode **1404** was used to create the electrosensory stimulus. A residual problem is, however, that the user has to memorize the significance of the several touch-sensitive areas or obtain visual or aural information on their significance.

FIG. **15** shows a further enhanced embodiment from the one described in connection with FIG. **14**. The embodiment shown in FIG. **15** uses different temporal variations of the intensity of the electrosensory stimulus, Wherein the different temporal variations provide the user with a tactile feedback indicating the significance of the touch-sensitive areas.

The operation of the embodiment shown in FIG. **14** differs from the one described in connection with FIG. **14** in that the controller, here denoted by reference numeral **1506**, applies different temporal variations to the intensity of the signal to the electrode **1404**. In this example, the first touch-sensitive area A_1 is processed similarly to the preceding embodiment, or in other words, the intensity of the electrosensory stimulus depends only on the presence of the finger **120** in close proximity to the area A_1. But in close proximity to areas A_2 and A_3, the controller **1506** also applies temporal variations to the intensity of the electrosensory stimulus. For example the significance (coarsely analogous with a displayed legend) of area A_2 is indicated by a pulsed electrosensory stimulus at a first (low) repetition rate, while the significance of area A_3 is indicated by a pulsed electrosensory stimulus at a second (higher) repetition rate. In an illustrative example, the three touch-sensitive areas A_1, A_2 and A_3 can invoke the three functions in a yes/no/cancel-type user interface, wherein the user can sense the positions of the user interface keys (here: the three touch-sensitive areas) and the indication of an accepted input only via tactile feedback. In other words, the user needs no visual or aural information on the positions of the touch-sensitive areas or on the selected function. The embodiment described in connection with FIG. **15** is particularly attractive in car navigators or the like, which should not require visual attention from their users.

In the embodiments shown in FIGS. **14** and **15**, when the user's finger **120** has selected the function assigned to area A_3 and the controller CTRL **1406**, **1506** generates the high-intensity electrosensory stimulus via the electrode **1404**, the high-intensity stimulus is sensed via any of the areas A_1, A_2 and A_3. In other words, if one finger of the user presses the area A_3, other finger(s) in close proximity to the other areas A_2 and/or A_3 will also sense the high-intensity stimulus. In cases where this is not desirable, the embodiments shown in FIGS. **14** and **15** can be combined with the multi-electrode embodiment disclosed in connection with FIG. **9**, such that the signal to each of several electrodes (shown in FIG. **9** as items **910***a* through **910***i*) is controlled individually.

It is readily apparent to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

REFERENCES

1. Gunther, Eric: "*Skinscape: A Tool for Composition in the Tactile Modality*" Masters thesis, Massachusetts Institute of Technology 2001, available on the Internet address: http://mf.media.mit.edu/pubs/thesis/guntherMS.pdf

We claim:

1. An apparatus for producing an electrosensory sensation to at least one body member to be stimulated, the apparatus comprising:

one or more conducting electrodes, each conducting electrode being provided with an insulator wherein, when the at least one body member to be stimulated being proximate to the conducting electrode, the insulator prevents flow of direct current from the conducting electrode to the at least one body member to be stimulated and a capacitive coupling over the insulator being formed between the conducting electrode and the at least one body member to be stimulated;

a high-voltage source for applying an electrical input to the one or more conducting electrodes, the electrical input comprises a low-frequency component in a frequency range between 10 Hz and 1000 Hz,

the capacitive coupling and electrical input being dimensioned to produce an electrosensory sensation, and

the electrosensory sensation is produced independently of any mechanical vibration of the one or more conducting electrodes or the insulator and independently of movement of the at least one body member to the one or more conducting electrodes.

2. The apparatus according to claim **1**, wherein at least one of the one or more conducting electrodes is positioned such that that the at least one body member to be stimulated most likely to be affected is part of a human hand.

3. The apparatus according to claim **1**, wherein the apparatus comprises one conducting electrode for each spatially distinct area of the at least one body member to be stimulated.

4. The apparatus according to claim **1**, wherein the apparatus comprises one conducting electrode for each of several spatially distinct areas of the at least one body member to be stimulated.

5. The apparatus according to claim **1**, further comprising an enclosure which contains the high-voltage source which is common to all the several conducting electrodes and wherein the enclosure also contains means for conveying the electrical input to zero or more of the several conducting electrodes simultaneously, under control of a common controller.

6. The apparatus according to claim **5**, wherein the apparatus is part of an input/output peripheral device connectable to a data processing equipment.

7. The apparatus according to claim **1**, wherein the electrical input also comprises a high-frequency component having a frequency which is higher than the frequency of the low-frequency component and lower than 500 kHz.

8. The apparatus according to claim **1**, comprising means for modulating the high-frequency component by the low-frequency component.

9. The apparatus according to claim **1**, wherein the electrical input to the one or more conducting electrodes has a peak-to-peak voltage of 500 to 100,000 Volts.

10. The apparatus according to claim **1**, wherein the insulator has a thickness between 0.1 mm and 50 mm.

11. A method for causing an electrosensory sensation to at least one body member to be stimulated, the method comprising:

providing one or more conducting electrodes, each conducting electrode being provided with an insulator wherein, when the at least one body member to be stimulated being proximate to the conducting electrode, the insulator prevents flow of direct current from the conducting electrode to the at least one body member to be